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LISTS OF SPECIES

Larval fish of the Campos Basin, southeastern Brazil

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ABSTRACT: Studies on the vertical distribution of larval fish in water masses along the Brazilian coast are very rare. The present study aimed to identify larval fish occurring in the surface (1 m) layer and at depth in four water masses of the Campos Basin, southeastern Brazil: South Atlantic Central Water (SACW) (250 m), Antarctic Intermediate Water (AAIW) (800 m), Upper Circumpolar Deep Water (UCDW) (1,200 m) and North Atlantic Deep Water (NADW) (2,300 m). Material used in this study was obtained in 2009 through nocturnal horizontal stratified hauls using a Multinet (500 µm mesh size) during both rainy (February to April) and dry periods (August to September). A total of 10,978 fish larvae comprising 169 taxa were identified during the rainy (n = 6,015) and dry (n = 4,963) periods. The number of taxa decreased as the sampling depth increased. Larvae of Clupeidae, Engraulidae and Scombridae dominated in samples collected in the surface layer, while Sternoptychidae and Myctophidae were the most representative families in SACW. The other three water masses were dominated by Gonostomatidae larvae.

INTRODUCTION

Icthyoplankton studies in Brazil began in the 20th century when some international expeditions collected plankton along the Brazilian coast. One of the pioneers, Matsuura (1971; 1972), studied the life cycle of *Sardinella brasiliensis* (Clupeidae). Since then, other studies in Brazilian waters have considered the taxonomy of some families and the ecology, distribution, ontogeny and other aspects of the early life of fish (Bonecker *et al.* 1992; 1993; Katsuragawa *et al*. 1993, 2006; Nonaka *et al.* 2000; Bonecker and Castro 2006; Namiki *et al.* 2007a, 2007b; Campos *et al.* 2010; Castro *et al.* 2010).

Although stratified sampling of ichthyoplankton in different water masses is an important tool in the study of eggs and larval dynamics in oceanic water (Moser and Smith 1993; Sassa *et al.* 2004), this technique has not been explored on the Brazilian coast. Vertical distribution data for larval fish has only been published by Matsuura and Kitahara (1995), who investigated the vertical distribution of larval *Engralis anchoita* in relation to the SACW intrusion, and by Goçalo *et al.* (2011), who focused on Phosichthyidae to a depth of 100 m. Other studies analyzed the whole water column, but were restricted to a depth of 200 m (Bonecker *et al.* 1992/1993; Katsuragawa *et al*. 1993, 2006; Ekau *et al.* 1999; Nonaka *et al.* 2000; Bonecker and Castro 2006).

The Campos Basin, southeastern Brazil, has particular oceanographic features due to the presence of eddies and the occurrence of upwelling (Silveira *et al*. 2000; Rodrigues and Lorenzzeti 2001). This area is also economically relevant due to the presence of many oilfields, and at present it is responsible for more than 80% of Brazilian oil production (Petrobras 2010).

The goal of this study is to report on larval fish occurring in a surface layer in the four water masses that influence the Campos Basin, which are the South Atlantic Central Water (SACW), Antarctic Intermediate Water (AAIW), Upper Circumpolar Deep Water (UCDW) and North Atlantic Deep Water (NADW).

MATERIALS AND METHODS

The study area is located off southern Espírito Santo and northern Rio de Janeiro states, from 20°26'37.232" S, 40°20'03.872" W to 23°00'48.576" S, 42°00'42.944" W, approximately (Figure 1). The biological material examined was obtained as part of the Habitats Project - Campos Basin Environmental Heterogeneity by CENPES/PETROBRAS. Sampling was carried out during oceanographic cruises in the 2009 rainy period (February to April) and dry period (August to September) and it was performed along

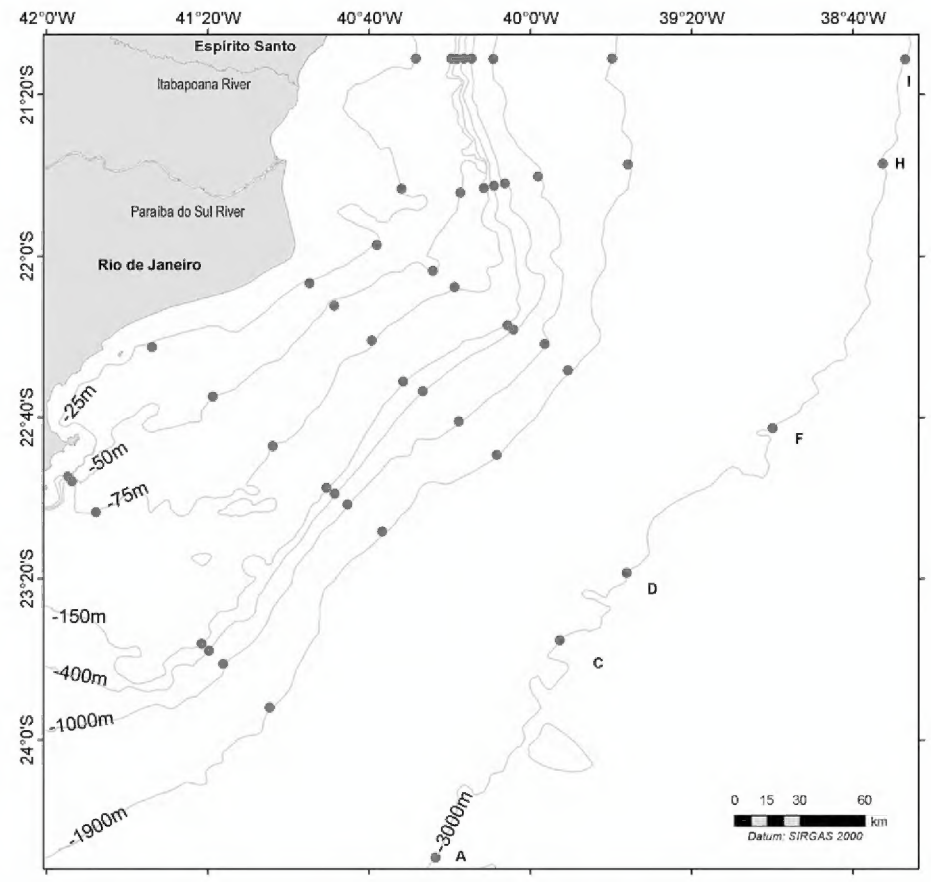

FIGURE 1. Study area showing the six grids and sampling stations.

six transects distributed perpendicularly to coastline from south to north, comprising a total of 48 stations (Figure 1). Ichthyoplankton was only collected at night using a Multinet that was towed horizontally at five depths, corresponding to the different water masses, totaling 216 samples: surface (1 m), 250 m (SACW), 800 m (AAIW), 1,200 m (UCDW) and 2,300 m (NADW). The Multinet was equipped with four nets with mesh apertures of 64 µm, 120 µm, 200 µm and 500 µm. Only the 500 µm net was used for ichthyoplankton analysis. At each depth, stratified hauls were done using an opening-closing mechanism: when the desired depth was reached the net was opened and towed, then after approximately 10–15 minutes the net was closed again. This procedure was repeated for each water mass, and after the water mass set was completed, the net was retrieved. Different nets were used at each depth to avoid sample contamination. Samples were immediately fixed in 4% buffered formalin.

Larval fish were sorted from all samples and preserved in 70% ethanol, except for the *leptocephalus* form, which was preserved in formalin 4% to avoid shrinkage. Identification was done to the lowest possible taxonomic level based on published descriptions (Moser 1996; Matsuura and Olivar 1999; Bonecker and Castro 2006; Richards 2006; Fahay 2007) and classification follows Nelson (2006). Specimens were deposited in the larval fish collection of the Zooplankton and Ichthyoplankton Integrated Laboratory, at the Universidade Federal do Rio de Janeiro, Brazil (DZUFRJ).

Results and Discussion

Summary information of each sampling station and a checklist of all taxa collected are presented in Tables 1 and 2, respectively. Voucher information, including DZUFRJ catalogue number are listed in the Appendix 1. A total of 10,978 fish larvae were identified during the rainy (n=6,015) and dry (n=4,963) periods, comprising 169 taxa. Families Myctophidae and Carangidae had the highest numbers of taxa identified, with 17 and 12 taxa, respectively (Table 2).

There was considerable variation in species abundance down the water column. A greater number of species were recorded in the surface layer compared to the other depths sampled. Larvae of Clupeidae (24%) were the most abundant in samples collected in the surface layer, with *Sardinella brasiliensis* being the most representative species (19%). Other abundant families at this depth included Myctophidae (16%), Engraulidae (16%) and Scombridae (14%) (Table 2). Similar results were also observed in the California Current (Moser and Smith, 1993), North Pacific (Sassa *et al.*, 2004) and Indian Ocean (Muhling *et al.* 2007), where most fish larvae are concentrated in the most productive upper 200 m layer.

In the 250 m layer (SACW), two families were the most abundant: Sternoptychidae (34%) and Myctophidae (32%), mainly represented by larvae of different species of *Argylopelecus* (14%) and *Diaphus* (10%), respectively. Samples collected in the 800 m layer (AAIW) were dominated by Gonostomatidae (77%), mostly represented by *Cyclothone braueri* (46%) (Table 2). In the 1,200 m layer (UCDW) most larvae collected belonged to the families Gonostomatidae and Myctophidae, contributing with 40% each (Table 2). Larvae of *Cyclothone* spp. (Gonostomatidae) dominated all samples collected in the 2,300 m layer (NADW). The presence of *Cyclothone* spp. from the surface to the 2,300 m layer was unexpected. In the California Current, for instance, sampling was done up to 1,000 m, but the distribution of *Cyclothone* spp. was limited to 200 m depth (Moser and Smith 1993).

The data obtained in the present study, concerning larval occurrence, confirmed the previous studies (*e.g.* Bonecker *et al.* 1992, 1993; Katsuragawa *et al*. 1993, 2006; Nonaka *et al.* 2000; Bonecker and Castro 2006; Namiki *et al.* 2007a, 2007b; Campos *et al.* 2010; Castro *et al.* 2010; Goçalo *et al.* 2011). Nevertheless, sampling in all previous studies in the region was restricted to the depth of 200 m. The possibility of collecting ichthyoplankton below the traditional depth limit was very important in showing that larvae of many species can be abundant in deeper regions as well, notably larval *Cyclothone* spp. which occurred as far down as 2,300 m.

Table 1. Collection data of the fish larvae sampled in the Campos Basin during rainy (March-April/2009) and dry (August-September/2009) periods.

SAMPLING PERIOD	STATION	WATER MASS	SAMPLING DEPTH (M)	LOCAL DEPTH (M)	DATE	LOCAL TIME	LATITUDE	LONGITUDE
Rainy	A1	Surface	1	45.0	04/12/09	20:36	22°54’58.004” S	41°55’00,711” W
Rainy	A2	Surface	1	47.1	04/12/09	21:55	22°55’38.417” S	41°53’21,274” W
Rainy	A3	Surface	1	83.4	04/12/09	00:11	23°03’07.102” S	41°47’02.630” W
Rainy	A5	Surface	1	142.4	03/17/09	22:45	23°35’59.804” S	41°21’12.240” W
Rainy	A6	Surface	1	384.6	03/17/09	00:27	23°37’14.732” S	41°19’01.910” W
Rainy	A8	Surface	1	978.6	03/18/09	20:51	23°37’44.626” S	41°13’08.388” W
Rainy	A10	Surface	1	1,864.1	03/17/09	01:31	23°46’35.943” S	40°59’57.889” W
Rainy	A12	Surface	1	3,020.1	03/05/09	23:24	21°42’58.013” S	40°19’54.164” W
Rainy	A6	SACW	250	436.4	03/17/09	01:39	23°35’51.219” S	41°17’37.979” W
Rainy	A8	SACW	250	983.5	03/18/09	19:26	23°38’38.654” S	41°13’54.443” W
Rainy	A10	SACW	250	1,891.7	03/17/09	00:13	23°46’07.658” S	41°00’10.721” W
Rainy	A12	SACW	250	3,017.3	03/05/09	01:01	24°24’27.225” S	40°20’34.300” W
Rainy	A8	AAIW	800	1,011.1	03/18/09	16:52	23°40’14.291” S	41°15’16.675” W
Rainy	A10	AAIW	800	1,867.5	03/17/09	21:46	23°46’39.609” S	40°59’53.857” W
Rainy	A12	AAIW	800	3,016.1	03/05/09	03:27	24°23’08.880” S	40°21’58.227” W
Rainy	A10	UCDW	1.2	1,879.8	03/17/09	18:24	23°49’42.760” S	41°02’36.942” W
Rainy	A12	UCDW	1.2	3,012.1	03/05/09	06:34	24°23’57.775” S	40°22’06.870” W
Rainy	A12	NADW	2.3	3,015.1	03/05/09	10:44	24°25’26.866” S	40°24’05.095” W

Table 1. *Continued.*

SAMPLING PERIOD	STATION	WATER MASS	SAMPLING DEPTH (M)	LOCAL DEPTH (M)	DATE	LOCAL TIME	LATITUDE	LONGITUDE
Rainy	C1	Surface	1	28.7	04/12/09	00:52	22°22'51.176" S	41°34'04.422" W
Rainy	C2	Surface	1	56.0	04/11/09	21:21	22°34'38.171" S	41°18'25.460" W
Rainy	C3	Surface	1	76.4	04/11/09	18:08	22°46'06.259" S	41°03'12.380" W
Rainy	C5	Surface	1	148.1	03/17/09	04:53	22°57'19.640" S	40°50'12.485" W
Rainy	C6	Surface	1	296.6	03/17/09	20:42	23°01'00.545" S	40°50'23.364" W
Rainy	C8	Surface	1	-	03/18/09	23:57	23°03'09.160" S	40°46'35.091" W
Rainy	C10	Surface	1	1,801.4	03/17/09	20:04	23°05'23.167" S	40°34'02.087" W
Rainy	C12	Surface	1	3,018.6	03/07/09	21:22	23°41'21.792" S	39°58'53.204" W
Rainy	C6	SACW	250	559.0	03/17/09	22:09	23°00'46.261" S	40°48'50.975" W
Rainy	C8	SACW	250	1,088.1	03/18/09	02:31	23°04'09.706" S	40°45'40.158" W
Rainy	C10	SACW	250	1,856.0	03/17/09	21:26	23°04'11.672" S	40°32'57.813" W
Rainy	C12	SACW	250	3,008.5	03/07/09	22:47	23°41'08.712" S	39°59'06.615" W
Rainy	C8	AAIW	800	1,048.3	03/18/09	04:06	23°04'58.197" S	40°46'56.277" W
Rainy	C10	AAIW	800	1,905.0	03/17/09	23:37	23°02'14.396" S	40°31'10.785" W
Rainy	C12	AAIW	800	3,019.1	03/07/09	21:37	23°38'16.463" S	39°52'46.857" W
Rainy	C10	UCDW	1.2	1,861.5	03/17/09	17:41	23°07'20.028" S	40°35'37.139" W
Rainy	C12	UCDW	1.2	3,006.8	03/07/08	01:04	23°35'41.162" S	39°50'45.581" W
Rainy	C12	NADW	2.3	3,009.6	03/07/08	05:01	23°34'10.963" S	39°51'05.227" W
Rainy	D1	Surface	1	31.3	04/10/09	02:40	22°06'20.709" S	40°54'15.939" W
Rainy	D2	Surface	1	56.0	04/09/09	23:48	22°12'01.969" S	40°48'15.453" W
Rainy	D3	Surface	1	73.4	04/09/09	21:11	22°20'46.613" S	40°39'02.170" W
Rainy	D5	Surface	1	136.4	03/21/09	18:54	21°42'58.013" S	40°31'11.456" W
Rainy	D6	Surface	1	321.3	03/21/09	22:24	22°33'53.468" S	40°28'02.079" W
Rainy	D8	Surface	1	990.7	03/20/09	01:59	22°40'34.959" S	40°16'59.569" W
Rainy	D10	Surface	1	1,904.4	03/23/09	04:36	22°48'44.536" S	40°07'43.109" W
Rainy	D12	Surface	1	2,989.9	03/08/08	20:41	23°17'56.237" S	39°35'22.345" W
Rainy	D6	SACW	250	411.6	03/21/09	20:57	22°34'03.668" S	40°27'41.234" W
Rainy	D8	SACW	250	990.6	03/22/09	04:11	22°40'28.500" S	40°16'51.123" W
Rainy	D10	SACW	250	1,947.1	03/23/09	03:18	22°50'15.651" S	40°09'01.684" W
Rainy	D12	SACW	250	2,994.7	03/08/08	22:13	23°15'45.071" S	39°33'26.988" W
Rainy	D8	AAIW	800	991.2	03/22/09	06:14	22°39'57.047" S	40°15'57.025" W
Rainy	D10	AAIW	800	1,846.6	03/22/09	22:14	22°47'53.099" S	40°06'57.072" W
Rainy	D12	AAIW	800	2,989.2	03/08/09	00:54	23°15'39.378" S	39°35'05.318" W
Rainy	D10	UCDW	1.2	1,989.6	03/22/09	18:54	22°49'47.345" S	40°07'58.529" W
Rainy	D12	UCDW	1.2	2,955.4	03/08/09	04:27	23°14'45.018" S	39°36'42.658" W
Rainy	D12	NADW	2.8	2,953.1	03/08/09	08:12	23°37'45.202" S	41°13'09.474" W
Rainy	F1	Surface	1	24.7	04/08/09	18:52	21°42'58.013" S	40°38'21.349" W
Rainy	F2	Surface	1	54.0	04/08/09	22:04	22°03'18.606" S	40°23'55.871" W
Rainy	F3	Surface	1	72.8	04/09/09	00:27	22°07'11.240" S	40°18'05.269" W
Rainy	F5	Surface	1	144.0	03/23/09	18:54	22°17'39.527" S	40°05'24.607" W
Rainy	F6	Surface	1	45.6	03/23/09	20:35	22°19'11.943" S	40°05'10.646" W
Rainy	F8	Surface	1	992.7	03/24/09	00:23	22°21'19.061" S	39°55'57.443" W
Rainy	F10	Surface	1	1,892.7	03/25/09	02:09	22°27'56.061" S	39°50'06.908" W
Rainy	F12	Surface	1	2,992.4	03/10/09	20:46	22°44'34.515" S	39°03'42.651" W
Rainy	F6	SACW	250	405.4	03/23/09	21:51	22°18'01.360" S	40°03'57.077" W
Rainy	F8	SACW	250	996.5	03/24/09	01:49	22°21'16.772" S	39°55'55.877" W
Rainy	F10	SACW	250	1,883.6	03/25/09	03:31	22°27'44.973" S	39°49'57.584" W
Rainy	F12	SACW	250	3,001.6	03/10/09	22:27	22°44'11.120" S	39°02'31.800" W
Rainy	F8	AAIW	800	1,010.0	03/24/09	03:56	22°20'46.303" S	39°55'10.191" W
Rainy	F10	AAIW	800	1,890.4	03/25/09	05:25	22°27'18.989" S	39°49'34.252" W
Rainy	F12	AAIW	800	2,994.1	03/10/09	00:50	22°42'56.033" S	39°03'16.710" W
Rainy	F10	UCDW	1.2	1,885.7	03/24/09	23:39	22°27'31.386" S	39°49'45.994" W
Rainy	F12	UCDW	1.2	3,027.3	03/10/09	17:47	22°45'56.676" S	38°58'05.050" W
Rainy	F12	NADW	2.3	3,016.1	03/10/09	06:25	23°36'03.230" S	41°21'16.626" W
Rainy	H1	Surface	1	25.4	04/02/09	18:50	21°43'28.063" S	40°31'49.556" W
Rainy	H2	Surface	1	45.0	04/02/09	21:56	21°44'47.909" S	40°17'24.243" W
Rainy	H3	Surface	1	72.8	04/02/09	23:40	21°42'48.063" S	40°11'32.086" W
Rainy	H5	Surface	1	144.9	04/09/09	01:11	21°42'18.856" S	40°09'03.573" W
Rainy	H6	Surface	1	392.1	04/01/09	23:47	21°41'34.658" S	40°06'28.413" W
Rainy	H8	Surface	1	1,005.0	03/31/09	19:19	21°39'56.885" S	39°58'17.894" W
Rainy	H10	Surface	1	1,895.1	03/31/09	02:11	21°38'10.423" S	39°35'47.816" W
Rainy	H12	Surface	1	3,123.3	03/11/09	00:23	21°51'44.609" S	38°34'14.174" W

Table 1. *Continued.*

SAMPLING PERIOD	STATION	WATER MASS	SAMPLING DEPTH (M)	LOCAL DEPTH (M)	DATE	LOCAL TIME	LATITUDE	LONGITUDE
Rainy	H6	SACW	250	413.1	03/31/09	22:18	21°41'18.209" S	40°06'00.164" W
Rainy	H8	SACW	250	1,016.4	03/31/09	17:34	21°40'35.162" S	39°57'53.557" W
Rainy	H10	SACW	250	1,895.1	03/31/09	00:46	21°37'55.120" S	39°35'47.033" W
Rainy	H12	SACW	250	3,105.7	03/11/09	01:47	21°49'37.707" S	38°33'58.560" W
Rainy	H8	AAIW	800	989.9	03/31/09	15:22	21°40'03.551" S	39°58'08.078" W
Rainy	H10	AAIW	800	1,878.5	03/30/09	21:17	21°35'24.948" S	39°37'05.459" W
Rainy	H12	AAIW	800	2,864.9	03/11/09	04:20	21°46'01.176" S	38°33'29.062" W
Rainy	H10	UCDW	1.2	1,897.0	03/30/09	17:01	21°38'09.058" S	39°35'48.140" W
Rainy	H12	UCDW	1.2	2,836.4	03/11/09	11:15	21°35'46.651" S	38°32'18.993" W
Rainy	H12	NADW	2.3	2,806.6	03/11/09	16:35	23°37'11.276" S	41°18'57.167" W
Rainy	I1	Surface	1	26.3	04/02/09	01:33	21°10'34.687" S	40°28'19.797" W
Rainy	I2	Surface	2	47.0	04/01/09	23:34	21°10'33.616" S	40°19'28.869" W
Rainy	I3	Surface	1	56.7	04/01/09	22:15	21°11'44.420" S	40°18'24.935" W
Rainy	I5	Surface	1	96.5	04/01/09	20:09	21°11'47.904" S	40°16'33.309" W
Rainy	I6	Surface	1	449.7	04/01/09	18:24	21°11'18.686" S	40°14'34.015" W
Rainy	I8	Surface	1	995.5	03/29/09	21:29	21°11'57.878" S	40°09'09.517" W
Rainy	I10	Surface	1	1,887.8	03/29/09	03:24	21°09'49.440" S	39°39'32.312" W
Rainy	I12	Surface	1	2,929.1	03/12/09	00:25	21°25'34.263" S	38°28'35.148" W
Rainy	I6	SACW	250	459.9	04/01/09	16:59	21°10'45.400" S	40°14'30.313" W
Rainy	I8	SACW	250	998.3	03/29/09	19:57	21°11'46.745" S	40°09'26.462" W
Rainy	I10	SACW	250	1,888.6	03/29/09	04:51	21°09'21.675" S	39°39'30.213" W
Rainy	I12	SACW	250	2,969.2	03/12/09	01:42	21°23'40.814" S	38°28'20.719" W
Rainy	I8	AAIW	800	1,006.8	03/29/09	16:39	21°11'43.739" S	40°09'18.565" W
Rainy	I10	AAIW	800	1,885.1	03/29/09	01:00	21°08'22.376" S	39°39'24.615" W
Rainy	I12	AAIW	800	1,888.2	03/12/09	19:19	21°09'40.758" S	39°39'31.053" W
Rainy	I10	UCDW	1.2	1,887.9	03/28/09	20:04	21°09'40.758" S	39°39'31.053" W
Rainy	I12	UCDW	1.2	3,120.1	03/12/09	12:45	21°10'14.841" S	38°26'47.590" W
Rainy	I12	NADW	2.3	2,985.6	03/12/09	22:13	23°35'54.924" S	41°17'43.940" W
Dry	A1	Surface	1	43.1	08/25/09	03:49	22°54'37.543" S	41°54'33.788" W
Dry	A2	Surface	1	52.7	08/25/09	02:25	22°57'14.976" S	41°53'09.974" W
Dry	A3	Surface	1	80.5	08/24/09	00:41	23°03'36.283" S	41°47'39.234" W
Dry	A5	Surface	1	144.3	08/21/09	02:05	23°35'56.949" S	41°22'12.582" W
Dry	A6	Surface	1	345.3	08/21/09	00:37	23°37'44.382" S	41°20'39.582" W
Dry	A8	Surface	1	1,062.8	08/24/09	21:10	23°41'05.919" S	41°15'54.887" W
Dry	A10	Surface	1	1,934.3	08/24/09	19:52	23°51'26.652" S	41°04'10.272" W
Dry	A12	Surface	1	-	08/28/09	02:41	21°42'58.013" S	40°24'16.556" W
Dry	A6	SACW	250	620.4	08/20/09	23:13	23°38'15.717" S	41°19'18.908" W
Dry	A8	SACW	250	887.4	08/20/09	19:24	23°41'56.942" S	41°18'19.059" W
Dry	A10	SACW	250	1,945.4	08/22/09	21:27	23°50'59.469" S	41°03'57.489" W
Dry	A12	SACW	250	-	08/08/09	04:49	24°28'17.475" S	40°24'40.908" W
Dry	A8	AAIW	800	1,053.9	08/20/09	17:10	23°41'53.223" S	41°15'42.451" W
Dry	A10	AAIW	800	1,945.0	08/23/09	23:45	23°50'35.084" S	41°03'13.756" W
Dry	A10	UCDW	1.2	1,840.0	08/22/09	17:15	23°49'52.950" S	41°05'56.364" W
Dry	C1	Surface	1	27.4	08/27/09	04:43	22°22'36.814" S	41°33'42.444" W
Dry	C2	Surface	1	53.1	08/27/09	23:40	22°34'48.329" S	41°18'29.513" W
Dry	C3	Surface	1	77.2	08/26/09	20:06	22°46'53.609" S	41°02'58.477" W
Dry	C5	Surface	1	143.0	08/20/09	01:32	22°56'57.797" S	40°50'44.974" W
Dry	C6	Surface	1	208.3	08/20/09	00:46	22°57'29.914" S	40°49'08.525" W
Dry	C8	Surface	1	-	08/19/09	02:02	23°02'09.910" S	40°48'10.955" W
Dry	C10	Surface	1	-	08/17/09	23:38	23°07'59.069" S	40°37'32.584" W
Dry	C12	Surface	1	-	08/09/09	22:58	23°35'25.374" S	39°53'08.343" W
Dry	C6	SACW	250	397.7	08/19/09	21:55	22°59'01.592" S	40°48'38.520" W
Dry	C8	SACW	250	951.0	08/19/09	04:10	23°01'45.042" S	40°46'49.061" W
Dry	C10	SACW	250	-	08/16/09	21:53	23°08'12.413" S	40°37'47.504" W
Dry	C12	SACW	250	-	08/09/09	00:49	23°34'20.810" S	39°52'18.701" W
Dry	C8	AAIW	800	-	08/18/09	18:40	23°00'12.931" S	40°45'45.783" W
Dry	C10	AAIW	800	-	08/16/09	17:56	23°05'55.721" S	40°35'30.744" W
Dry	C12	AAIW	800	-	08/09/09	03:14	23°36'17.113" S	39°53'38.968" W
Dry	C10	UCDW	1.2	-	08/17/09	02:11	23°06'10.701" S	40°36'06.151" W
Dry	C12	UCDW	1.2	-	08/09/09	07:15	23°36'26.498" S	39°55'27.534" W
Dry	C12	NADW	2.3	-	08/08/09	20:16	23°35'29.769" S	39°52'30.400" W
Dry	D1	Surface	1	29.8	09/15/09	06:04	22°06'42.457" S	40°54'43.579" W

Table 1. *Continued.*

SAMPLING PERIOD	STATION	WATER MASS	SAMPLING DEPTH (M)	LOCAL DEPTH (M)	DATE	LOCAL TIME	LATITUDE	LONGITUDE
Dry	D2	Surface	1	56.9	09/15/09	19:49	22°12'27.565" S	40°48'39.967" W
Dry	D3	Surface	1	71.7	09/15/09	17:47	22°21'11.475" S	40°39'58.747" W
Dry	D5	Surface	1	139.4	08/28/09	04:48	22°30'49.664" S	40°31'14.546" W
Dry	D6	Surface	1	394.0	08/28/09	02:56	22°33'21.940" S	40°26'24.770" W
Dry	D8	Surface	1	996.5	08/23/09	22:31	22°40'21.597" S	40°17'20.771" W
Dry	D10	Surface	1	2,345.6	08/28/09	19:45	22°55'43.833" S	40°12'59.816" W
Dry	D12	Surface	1	-	08/11/09	19:15	23°18'20.733" S	39°36'52.748" W
Dry	D6	SACW	250	431.5	08/28/09	01:39	22°34'15.791" S	40°26'34.694" W
Dry	D8	SACW	250	1,033.7	08/27/09	21:04	22°42'01.196" S	40°18'21.495" W
Dry	D10	SACW	250	1,698.5	08/28/09	21:49	22°53'12.868" S	40°16'37.421" W
Dry	D12	SACW	250	-	08/11/09	21:11	23°18'35.349" S	39°36'05.948" W
Dry	D8	AAIW	800	1,026.5	08/27/09	18:05	22°40'30.483" S	40°16'38.208" W
Dry	D10	AAIW	800	1,843.0	08/29/09	00:16	22°53'01.775" S	40°13'42.708" W
Dry	D12	AAIW	800	-	08/12/09	23:43	23°15'00.078" S	39°35'52.279" W
Dry	D10	UCDW	1.2	2,028.0	08/29/09	03:20	22°53'38.860" S	40°12'24.275" W
Dry	D12	UCDW	1.2	-	08/12/09	06:55	23°06'35.792" S	39°25'47.275" W
Dry	D12	NADW	2.8	-	08/11/09	16:31	23°18'38.094" S	39°36'00.809" W
Dry	F1	Surface	1	26.2	09/16/09	01:12	21°57'30.289" S	40°38'40.487" W
Dry	F2	Surface	1	113.4	09/15/09	04:28	22°03'31.941" S	40°23'48.614" W
Dry	F3	Surface	1	74.8	09/14/09	18:29	22°07'37.014" S	40°18'37.334" W
Dry	F5	Surface	1	148.3	08/30/09	04:57	22°17'24.392" S	40°05'18.910" W
Dry	F6	Surface	1	546.4	08/30/09	04:08	22°18'24.838" S	40°02'46.349" W
Dry	F8	Surface	1	1,482.1	08/29/09	23:04	22°17'19.974" S	39°52'22.765" W
Dry	F10	Surface	1	1,927.5	08/31/09	02:24	22°27'05.729" S	39°49'20.391" W
Dry	F12	Surface	1	-	08/12/09	19:02	22°42'03,674" S	38°59'30.362" W
Dry	F6	SACW	250	480.2	08/30/09	02:11	22°18'50.369" S	40°04'07.421" W
Dry	F8	SACW	250	1,113.6	08/29/09	21:20	22°18'36.583" S	39°53'42.781" W
Dry	F10	SACW	250	1,946.5	08/31/09	01:02	22°26'41.368" S	39°48'56.976" W
Dry	F12	SACW	250	-	08/12/09	21:10	22°41'13.659" S	38°58'46.180" W
Dry	F8	AAIW	800	1,026.4	08/29/09	19:06	22°20'34.711" S	39°54'57.720" W
Dry	F10	AAIW	800	1,917.8	08/30/09	22:24	22°27'05.282" S	39°49'22.926" W
Dry	F12	AAIW	800	-	08/13/09	00:15	22°40'21.363" S	38°59'07.920" W
Dry	F10	UCDW	1.2	1,957.2	08/30/09	19:46	22°29'30.968" S	39°51'28.621" W
Dry	F12	UCDW	1.2	-	08/13/09	04:18	22°41'42.033" S	38°57'36.588" W
Dry	F12	NADW	2.3	-	08/12/09	16:41	22°42'47.015" S	38°59'44.483" W
Dry	H1	Surface	1	28.1	09/14/09	01:10	21°44'06.875" S	40°31'33.874" W
Dry	H2	Surface	1	52.7	09/14/09	04:26	21°44'38.558" S	40°17'25.984" W
Dry	H3	Surface	1	69.0	09/14/09	22:11	21°43'16.660" S	40°11'35.854" W
Dry	H5	Surface	1	163.6	09/15/09	00:30	21°42'37.978" S	40°08'33.881" W
Dry	H6	Surface	1	430.0	09/04/09	22:14	21°42'21.716" S	40°05'21.647" W
Dry	H8	Surface	1	499.0	09/11/09	00:32	21°45'47.136" S	40°03'17.367" W
Dry	H10	Surface	1	1,915.0	09/05/09	19:33	21°36'34.591" S	39°37'07.954" W
Dry	H6	SACW	250	399.5	09/04/09	18:49	21°42'58.013" S	40°05'19.853" W
Dry	H8	SACW	250	811.3	09/11/09	02:27	21°46'05.332" S	39°58'33.290" W
Dry	H10	SACW	250	1,935.8	09/05/09	18:10	21°37'08.743" S	39°35'54.219" W
Dry	H8	AAIW	800	998.3	09/11/09	04:32	21°44'29.597" S	39°58'04.202" W
Dry	H10	AAIW	800	1,881.7	09/05/09	21:35	21°35'38.401" S	39°38'58.369" W
Dry	H10	UCDW	1.2	1,884.8	09/06/09	02:59	21°35'56.282" S	39°38'59.436" W
Dry	I1	Surface	1	33.30	09/13/09	20:12	21°11'55.793" S	40°28'09.569" W
Dry	I2	Surface	2	104.8	09/13/09	05:18	21°10'59.783" S	40°20'13.283" W
Dry	I3	Surface	1	65.0	09/13/09	04:07	21°11'41.212" S	40°17'58.318" W
Dry	I5	Surface	1	157.1	09/13/09	02:38	21°11'12.114" S	40°16'23.970" W
Dry	I6	Surface	1	521.6	09/13/09	00:56	21°10'54.206" S	40°14'27.094" W
Dry	I8	Surface	1	1,041.4	09/12/09	21:46	21°10'58.948" S	40°09'20.432" W
Dry	I10	Surface	1	1,922.2	09/11/09	19:42	21°11'15.206" S	39°39'37.904" W
Dry	I6	SACW	250	655.8	09/13/09	23:46	21°11'40.295" S	40°13'36.646" W
Dry	I8	SACW	250	1,029.6	09/12/09	20:17	21°11'01.712" S	40°09'31.031" W
Dry	I10	SACW	250	1,905.5	09/11/09	21:13	21°10'58.558" S	39°39'48.179" W
Dry	I8	AAIW	800	985.4	09/12/09	17:34	21°10'15.097" S	40°10'08.972" W
Dry	I10	AAIW	800	1,905.1	09/11/09	23:05	21°09'57.811" S	39°40'21.161" W
Dry	I10	UCDW	1.2	1,994.2	09/11/09	17:39	21°12'53.516" S	39°38'07.661" W

Table 2. Abundance (in number and as percentage) of fish larvae collected in each water mass during the 2009 cruise performed at Campos Basin.

Taxa	Water Masses									
	Surface		SACW		AAIW		UCDW		NADW	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Elopiformes										
Elopidae										
Elops sp.	2	0.02								
Albuliformes										
Albulidae										
Albula vulpes (Linnaeus, 1758)	1	<0.01								
Anguilliformes	44	0.41	1	2.00	1	1.05				
Ophichthidae	11	<0.01								
Ahlia egmontis (Jordan, 1884)	1	<0.01								
Ariosoma balearicum (Delaroche, 1809)	2	0.02								
Avocettina sp.	1	<0.01								
Ophichthus cylindroideus (Ranzani, 1839)	2	0.02								
Clupeiformes	88	0.81								
Engraulidae	1,680	15.52								
Clupeidae	87	0.80	2	4.00						
Harengula jaguana Poey, 1865	471	4.35								
Opisthonema oglinum (Lesueur, 1818)	16	0.15								
Sardinella brasiliensis (Steindachner, 1879)	2,027	18.73								
Osmeriformes										
Bathylagidae										
Melanolagus bericoides (Borodin, 1929)			1	2.00						
Stomiiformes										
Gonostomatidae	4	0.04								
Cyclothone acclinidens Garman, 1899	2	0.02			4	4.21				
Cyclothone alba Brauer, 1906					11	11.58				
Cyclothone braueri Jespersen & Tåning, 1926	2	0.02			44	46.32	1	10.00		
Cyclothone pseudopallida Mukhacheva, 1964					11	11.58	1	10.00		
Cyclothone spp.	28	0.26			3	3.16	2	20.00	1	100
Gonostoma elongatum Günther, 1878	4	0.04								
Margrethia obtusirostra Jespersen & Tåning, 1919			1	2.00						
Sternoptychidae			3	6.00			1	10.00		
Argyropelecus spp.			7	14.00						
Argyropelecus aculeatus Valenciennes, 1850			2	4.00						
Maurolicus stehmanni Parin & Kobyliansky, 1993	635	5.87	5	10.00						
Sternoptyx diaphana Hermann, 1781					2	2.11				
Phosichthyidae										
Pollichthys mauli (Poll, 1953)	86	0.79	2	4.00						
Vinciguerria nimbaria (Jordan & Williams, 1895)	61	0.56	1	2.00	1	1.05				
Stomiidae	2	0.02								
Stomias sp.	1	<0.01								
unidentified larvae of Astronesthinae	1	<0.01								
unidentified larvae of Melanostomiinae	1	<0.01								
Aulopiformes										
Synodontidae	2	0.02								
Saurida sp.	51	0.47								
Synodus sp.	2	0.02								
Synodus foetens (Linnaeus, 1766)	20	0.18								
Synodus synodus (Linnaeus, 1758)	3	0.03								
Trachinocephalus myops (Forster, 1801)	2	0.02								
Chlorophthalmidae										
Chlorophthalmus brasiliensis Mead, 1958	1	<0.01								
Parasudis truculenta (Goode & Bean, 1896)	1	<0.01								
Scopelarchidae			1	2.00						
Paralepididae	3	0.03								
Anotopterus pharao Zugmayer, 1911					1	1.05				
Lestidiops affinis (Ege, 1930)	3	0.03								
Lestidium atlanticum Borodin, 1928	18	0.17								
Lestrolepis intermedia (Poey, 1868)	12	0.11								

TABLE 2. ***CONTINUED.***

Taxa	Water Masses									
	Surface		SACW		AAIW		UCDW		NADW	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Stemonosudis sp.	2	0.02								
Sudis atrox Rofen, 1963	1	<0.01								
Myctophiformes										
Neoscopelidae										
Neoscopelus macrolepidotus Johnson, 1863	1	<0.01								
Myctophidae	142	1.31	2	4.00	1	1.05	2	20.00		
Benthosema suborbitale (Gilbert, 1913)	4	0.04								
Bolinichthys distofax Johnson, 1975	1	<0.01								
Ceratoscopelus warmingii (Lütken, 1892)			1	2.00						
Diaphus dumerilii (Bleeker, 1856)	1	<0.01								
Diaphus spp.	681	6.29	5	10.00	2	2.11	1	10.00		
Hygophum spp.	13	0.12	1	2.00	1	1.05				
Hygophum reinhardtii (Lütken, 1892)	22	0.20								
Myctophum affine (Lütken, 1892)	182	1.68					1	10.00		
Myctophum asperum Richardson, 1845	1	<0.01								
Myctophum nitidulum Garman, 1899	2	0.02								
Myctophum obtusirostre Tåning, 1928	3	0.03			1	1.05				
Myctophum sp.	3	0.03								
Lampadena sp.	2	0.02								
Lampanyctus cf. *photonotus* Parr, 1928	3	0.03								
Lampanyctus sp.	2	0.02								
Lepidophanes gaussi (Brauer, 1906)	399	3.69								
Lepidophanes guentheri (Goode & Bean, 1896)	215	1.99	5	10.00	2	2.11				
Notolychnus valdiviae (Brauer, 1904)			2	4.00						
Notoscopelus caudispinosus (Johnson, 1863)	2	0.02								
Lampriformes										
Lampridae										
Lampris guttatus (Brünnich, 1788)	1	<0.01								
Gadiformes										
Bregmacerotidae										
Bregmaceros atlanticus Goode & Bean, 1886	3	0.03			1	1.05				
Bregmaceros cantori Milliken & Houde, 1984	40	0.37								
Ophidiiformes										
Carapidae										
Carapus bermudensis (Jones, 1874)	1	<0.01								
Echiodon dawsoni Williams & Shipp, 1982	1	<0.01								
Ophidiidae	6	0.06								
Ophidion selenops Robins & Böhlke, 1959	1	<0.01								
Lophiiformes										
Ceratiidae										
unidentified larvae	1	<0.01								
Mugiliformes										
Mugilidae										
Mugil sp.	4	0.04								
Beloniformes										
Exocoetidae										
Hirundichthys affinis (Günther, 1866)	1	<0.01								
Stephanoberyciformes										
Melamphaeidae										
Melamphaes simus Ebeling, 1962			1	2.00						
Beryciformes										
Trachichthyidae	1	<0.01								
Paratrachichthys sp.	1	<0.01								
Holocentridae										
Myripristis sp.	1	<0.01								
Sargocentron sp.	3	0.03								
Gasterosteiformes										
Syngnathidae	1	<0.01								

Table 2. ***Continued.***

Taxa	Water Masses									
	Surface		SACW		AAIW		UCDW		NADW	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Hippocampus reidi Ginsburg, 1933	2	0.02								
Fistulariidae										
Fistularia petimba Lacepède, 1803	2	0.02								
Fistularia tabacaria Linnaeus, 1758	1	<0.01								
Scorpaeniformes										
Scorpaenidae	10	0.09								
Pontinus corallinus Miranda Ribeiro, 1903	1	<0.01								
Scorpaena sp.	7	0.06								
Triglidae										
Prionotus sp.	2	0.02								
Perciformes										
Serranidae	136	1.26								
Anthias sp.	2	0.02								
Epinephelus sp.	2	0.02								
Pseudogramma gregoryi (Breder, 1927)	1	<0.01								
Rypticus spp.	5	0.05								
Serranus auriga (Cuvier, 1829)	23	0.21			1	1.05				
Serranus spp.	171	1.58								
unidentified larvae of Athiinae	13	0.12								
unidentified larvae of Epinephelini	3	0.03								
Opistognathidae										
Opistognathus sp.	5	0.05								
Priacanthidae										
Heteropriacanthus cruentatus (Lacepède, 1801)	2	0.02								
Apogonidae	20	0.18								
Apogon sp.	9	0.08								
Astrapogon sp.	16	0.15								
Pomatomidae										
Pomatomus saltatrix (Linnaeus, 1766)	2	0.02								
Coryphaenidae										
Coryphaena equiselis Linnaeus, 1758	2	0.02								
Coryphaena hippurus Linnaeus, 1758	30	0.28								
Carangidae	15	0.14								
Caranx crysos (Mitchill, 1815)	1	<0.01								
Caranx latus Agassiz, 1831	8	0.07								
Caranx spp.	17	0.16								
Chloroscombrus chrysurus (Linnaeus, 1766)	30	0.28								
Decapterus punctatus (Cuvier, 1829)	14	0.13								
Decapterus spp.	11	0.10								
Naucrates ductor (Linnaeus, 1758)	3	0.03								
Oligoplites sp.	2	0.02								
Pseudocaranx dentex (Bloch & Schneider, 1801)	7	0.06								
Selar crumenophthalmus (Bloch, 1793)	66	0.61								
Selene setapinnis (Mitchill, 1815)	2	0.02								
Selene vomer (Linnaeus, 1758)	1	<0.01								
Seriola sp.	9	0.08								
Trachurus lathami Nichols, 1920	68	0.63								
Lutjanidae	12	0.11								
Lutjanus synagris (Linnaeus, 1758)	19	0.18								
Lutjanus spp.	5	0.05								
Rhomboplites aurorubens (Cuvier, 1829)	1	<0.01								
Gerreidae	3	0.03								
Diapterus rhombeus (Cuvier, 1829)	5	0.05								
Diapterus sp.	7	0.06								
Eucinostomus lefroyi (Goode, 1874)	5	0.05								
Eucinostomus sp.	3	0.03								
Haemulidae	44	0.41								
Haemulon plumierii (Lacepède, 1801)	4	0.04								

Table 2. ***Continued.***

Taxa	Water Masses									
	Surface		SACW		AAIW		UCDW		NADW	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Sparidae	1	<0.01								
Calamus sp.	1	<0.01								
Pagrus pagrus (Linnaeus, 1758)	37	0.34								
Sciaenidae	45	0.42								
Cynoscion sp.	48	0.44								
Menticirrhus americanus (Linnaeus, 1758)	3	0.03								
Pareques sp.	1	<0.01								
Stellifer sp.	10	0.09								
Mullidae	30	0.28								
Upeneus parvus Poey, 1852	11	0.10								
Kyphosidae										
Kyphosus incisor (Cuvier, 1831)	1	<0.01								
Chaetodontidae	17	0.16								
unidentified larvae										
Pomacanthidae	11	0.10			1	1.05				
Holacanthus tricolor (Bloch, 1795)	1	<0.01								
Holacanthus sp.	1	<0.01								
Cirrhitidae										
Amblycirrhitus pinos (Mowbray, 1927)					4	4.21				
Pomacentridae	12	0.11								
Abudefduf saxatilis (Linnaeus, 1758)	1	<0.01								
Stegastes leucostictus (Müller & Troschel, 1848)	21	0.19								
Microspathodon chrysurus (Cuvier, 1830)	2	0.02								
Labridae	9	0.08								
Doratonotus megalepis Günther, 1862	13	0.12								
Halichoeres poeyi (Steindachner, 1867)	86	0.79								
Halichoeres sp.	1	<0.01								
Scaridae	31	0.29								
Cryptotomus roseus Cope, 1871	20	0.18	2	4.00						
Scarus spp.	17	0.16								
Sparisoma spp.	262	2.42	3	6.00	3	3.16				
Chiasmodontidae										
Chiasmodon niger Johnson, 1864	1	<0.01								
Uranoscopidae	1	<0.01								
unidentified larvae										
Tripterygiidae										
Enneanectes altivelis Rosenblatt, 1960	5	0.05								
Dactyloscopidae	6	0.06								
unidentified larvae										
Blenniidae	16	0.15								
Hypleurochilus fissicornis (Quoy & Gaimard, 1824)	1	<0.01								
Parablennius pilicornis (Cuvier, 1829)	2	0.02								
Callionymidae										
Callionymus bairdi Jordan, 1888	5	0.05								
Eleotridae	1	<0.01								
Dormitator maculatus (Bloch, 1792)	9	0.08								
Gobiidae	46	0.43	1	2.00						
Coryphopterus sp.	8	0.07								
Ctenogobius boleosoma (Jordan & Gilbert, 1882)	1	<0.01								
Ctenogobius sp.	20	0.18								
Gobiosoma nudum (Meek & Hildebrand, 1928)	17	0.16								
Microgobius carri Fowler, 1945	6	0.06								
Microgobius sp.	9	0.08								
Microdesmidae										
Microdesmus bahianus Dawson, 1973	9	0.08								
Microdesmus longipinnis (Weymouth, 1910)	3	0.03								
Pereleotridae										
Pereleotris randalli Gasparini, Rocha & Floeter, 2001	222	2.05					1	10.00		

Table 2. ***Continued.***

Taxa	Water Masses									
	Surface		SACW		AAIW		UCDW		NADW	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Acanthuridae										
Acanthurus sp.	3	0.03								
Sphyraenidae										
Sphyraena barracuda (Edwards, 1771)	1	<0.01								
Sphyraena guachancho Cuvier, 1829	15	0.14								
Sphyraena tome Fowler, 1903	6	0.06								
Gempylidae	1	<0.01								
Gempylus serpens Cuvier, 1829	7	0.06								
Nealotus tripes Johnson, 1865	1	<0.01								
Nesiarchus nasutus Johnson, 1862			1	2.00						
Trichiuridae										
Benthodesmus sp.	30	0.28								
Trichiurus lepturus Linnaeus, 1758	12	0.11								
Scombridae	385	3.56								
Auxis sp.	44	0.41								
Auxis rochei (Risso, 1810)	9	0.08								
Auxis thazard (Lacepède, 1800)	3	0.03								
Euthynnus alletteratus (Rafinesque, 1810)	12	0.11								
Sarda sarda (Bloch, 1793)	7	0.06								
Scomber colias Gmelin, 1789	1,004	9.28								
Scomberomorus sp.	3	0.03								
Thunnus atlanticus (Lesson, 1831)	1	<0.01								
Thunnus spp.	41	0.38								
Istiophoridae	2	0.02								
unidentified larvae										
Nomeidae										
Cubiceps sp.	3	0.03								
Stromateidae										
Peprilus paru (Linnaeus, 1758)	1	<0.01								
Caproidae										
Antigonia capros Lowe, 1843	76	0.70								
Pleuronectiformes	1	<0.01								
Paralichthyidae	10	0.09								
Citharichthys sp.	1	<0.01								
Syacium papillosum (Linnaeus, 1758)	28	0.26								
Bothidae										
Bothus ocellatus (Agassiz, 1831)	25	0.23								
Monolene antillarum Norman, 1933	6	0.06								
Achiridae										
Achirus lineatus (Linnaeus, 1758)	2	0.02								
Cynoglossidae										
Symphurus tessellatus (Quoy & Gaimard, 1824)	1	<0.01								
Symphurus trewavasae Chabanaud, 1948	1	<0.01								
Tetraodontiformes										
Balistidae										
Balistes capriscus Gmelin, 1789	1	<0.01								
Monacanthidae	2	0.02								
Aluterus heudelotii Hollard, 1855	1	<0.01								
Aluterus schoepfii (Walbaum, 1792)	3	0.03								
Aluterus sp.	2	0.02								
Stephanolepis hispidus (Linnaeus, 1766)	32	0.30								
Tetraodontidae	2	0.02								
Sphoeroides sp.	1	<0.01								

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Appendix 1. Voucher information on the fish larvae collected in Campos Basin. Number of specimens in parenthesis.

Elopidae: *Elops* sp. (2) DZUFRJ 28074; 28079. **Albulidae:** *Albula vulpes* (1) DZUFRJ 28078. **Anguilliformes:** (46) DZUFRJ 28081–28094. **Ophichthidae:** (11) DZUFRJ 28035–28040; 28077. *Ahlia egmontis* (1) DZUFRJ 28070. *Ophichthus cylindroideus* (2) DZUFRJ 28069; 28073. **Congridae:** *Ariosoma balearicum* (2) DZUFRJ 28071–28072. **Nettastomatidae:** *Avocettina* sp. (1) DZUFRJ 28076. **Clupeiformes:** (88) DZUFRJ 29692–29700. **Engraulidae:** (1,680) DZUFRJ 29749; 29827–29830; 29832–29838; 29840; 29842–29867; 29869–29870; 29872; 29874–29877. **Clupeidae:** (89) DZUFRJ 29764–29772. *Harengula jaguana* (471) DZUFRJ 28233; 29751–29757; 29759; 29762. *Opisthonema oglinum* (16) DZUFRJ 29737–29743. *Sardinella brasiliensis* (2,027) DZUFRJ 28228–28232; 28234–28236; 28833; 29784–29785; 29787–29789; 29791–29797; 29799–29800; 29802–29806; 29808–29817. **Bathylagidae:** *Melanolagus bericoides* (1) DZUFRJ 29675. **Gonostomatidae:** (4) DZUFRJ 29614. *Cyclothone* spp. (34) DZUFRJ 29631–29649; 29750. *Cyclothone acclinidens* (6) DZUFRJ 29539–29543. *Cyclothone alba* (11) DZUFRJ 29615–29617. *Cyclothone braueri* (47) DZUFRJ 29582–29603. *Cyclothone pseudopallida* (12) DZUFRJ 29621–29628. *Margrethia obtusirostra* (1) DZUFRJ 28028. *Gonostoma elongatum* (4) DZUFRJ 29613. **Sternoptychidae:** (4) DZUFRJ 28027; 28194. *Argyropelecus* spp. (7) DZUFRJ 28023–28024; 29763; 29820–29822. *Argyropelecus aculeatus* (2) DZUFRJ 28025–28026. *Sternoptyx diaphana* (2) DZUFRJ 28019–28020. *Maurolicus stehmanni* (640) DZUFRJ 28127–28141; 28351. **Phosichthyidae:** *Pollichthys mauli* (88) DZUFRJ 28095–28105. *Vinciguerria nimbaria* (63) DZUFRJ 28166–28173; 28175–28182. **Stomiidae:** (2) DZUFRJ 28371–28372. Astronesthinae (1) DZUFRJ 28370. Melanostomiinae (1) DZUFRJ 28369. *Stomias* sp. (1) DZUFRJ 28373. **Synodontidae:** (2) DZUFRJ 28337–28338. *Saurida* sp. (51) DZUFRJ 28374–28379. *Synodus* sp. (2) DZUFRJ 28339–28340. *Synodus foetens* (20) DZUFRJ 28347–28349. *Synodus synodus* (3) DZUFRJ 28431–28441. *Trachinocephalus myops* (2) DZUFRJ 28335. **Chlorophthalmidae:** *Chlorophthalmus brasiliensis* (1) DZUFRJ 29730. *Parasudis truculenta* (1) DZUFRJ 29728. **Scopelarchidae:** (1) DZUFRJ 28190. **Paralepididae:** (3) DZUFRJ 28029–28031. *Anotopterus pharao* (1) DZUFRJ 28015. *Lestidiops affinis* (3) DZUFRJ 28032–28034. *Lestidium atlanticum* (18) DZUFRJ 28115; 28117–28126. *Lestrolepis intermedia* (12) DZUFRJ 28041–28047. *Stemonosudis* sp. (2) DZUFRJ 28021–28022. *Sudis atrox* (1) DZUFRJ 28018. **Neoscopelidae:** *Neoscopelus macrolepidotus* (1) DZUFRJ 27693. **Myctophidae:** (147) DZUFRJ 27816–27838; 27840–27841; 27843–27854; 29941. *Benthosema suborbitale* (4) DZUFRJ 27706–27707. *Bolinichthys distofax* (1) DZUFRJ 27708. *Ceratoscopelus warmingii* (1) DZUFRJ 27695. *Diaphus* spp. (689) DZUFRJ 27918–27942; 27968–27970; 27972–27976; 27979–27982; 27984; 27986; 27988–28014. *Diaphus dumerilii* (1) DZUFRJ 28832. *Hygophum* spp. (15) DZUFRJ 27735–27743. *Hygophum reinhardtii* (22) DZUFRJ 27744–27753. *Myctophum* sp. (3) DZUFRJ 27697–27698. *Myctophum affine* (183) DZUFRJ 28220–28227. *Myctophum asperum* (1) DZUFRJ 27699. *Myctophum nitidulum* (2) DZUFRJ 27704–27705. *Myctophum obtusirostre* (4) DZUFRJ 27715; 27718; 27720–27721. *Lampadena* sp. (2) DZUFRJ 27711–27712. *Lampanyctus* sp. (2) DZUFRJ 27702–27703. *Lampanyctus* cf. *photonotus* (3) DZUFRJ 27701. *Lepidophanes guentheri* (222) DZUFRJ 27898–27899; 27901–27907; 27909–27916; 27944–27952; 27954–27967. *Lepidophanes gaussi* (399) DZUFRJ 27754–27772; 27776–27777; 27779–27784; 27786–27789. *Notolychnus valdiviae* (2) DZUFRJ 27691–27692. *Notoscopelus caudispinosus* (2) DZUFRJ 27694. **Lampridae:** *Lampris guttatus* (1) DZUFRJ 29671. **Bregmacerotidae:** *Bregmaceros atlanticus* (4) DZUFRJ 28408; 28414; 29781. *Bregmaceros cantori* (40)

DZUFRJ 28406–28407; 28409–28413. **Carapidae:** *Carapus bermudensis* (1) DZUFRJ 28363. *Echiodon dawsoni* (1) DZUFRJ 28362. **Ophidiidae:** *Ophidion selenops* (1) DZUFRJ 27288. **Ceratiidae:** (1). **Mugilidae:** *Mugil* sp. (4) DZUFRJ 29546; 29554; 29558. **Exocoetidae:** *Hirundichthys affinis* (1) DZUFRJ 27548. **Melamphaeidae:** *Melamphaes simus* (1) DZUFRJ 29777. **Trachichthyidae:** (1) DZUFRJ 28204. *Paratrachichthys* sp. (1) DZUFRJ 28203. **Holocentridae:** *Myripristis* sp. (1) DZUFRJ 27539. *Sargocentron* sp. (3) DZUFRJ 27540. **Syngnathidae:** (1) DZUFRJ 28831. *Hippocampus reidi* (2) DZUFRJ 28187. **Fistulariidae:** *Fistularia petimba* (2) DZUFRJ 27542–27543. *Fistularia tabacaria* (1) DZUFRJ 27541. **Scorpaenidae:** *Pontinus corallinus* (1) DZUFRJ 28261. *Scorpaena* sp. (7) DZUFRJ 28262; 28264. **Triglidae:** *Prionotus* sp. (2) DZUFRJ 28197–28198. **Serranidae:** (136) DZUFRJ 29895–29923; 29925–29927. *Serranus* spp. (171) DZUFRJ 29878–29894; 29912–29922. *Serranus auriga* (24) DZUFRJ 29907–29909; 29928–29930. Athiinae (13) DZUFRJ 29903–29906. *Anthias* sp. (2) DZUFRJ 29938. Epinephelini (3) DZUFRJ 29910–29911. *Epinephelus* sp. (2) DZUFRJ 29937. *Pseudogramma gregoryi* (1) DZUFRJ 29931. *Rypticus* spp. (5) DZUFRJ 29932–29936. **Opistognathidae:** *Opistognathus* sp. (5) DZUFRJ 28365–28368. **Priacanthidae:** *Heteropriacanthus cruentatus* (2) DZUFRJ 29744 **Apogonidae:** (20) DZUFRJ 29701–29707. *Apogon* sp. (9) DZUFRJ 29708–29712. *Astrapogon* sp. (16) DZUFRJ 29713–29715; 29717–29723. **Pomatomidae:** *Pomatomus saltatrix* (2) DZUFRJ 29745–29746. **Coryphaenidae:** *Coryphaena equiselis* (2) DZUFRJ 27799. *Coryphaena hippurus* (30) DZUFRJ 27790–27792; 27794–27798; 27800; 27802; 27804; 27806; 27807; 27810–27814. **Carangidae:** (15) DZUFRJ 27572; 27620; 27625; 27628; 27633–27634. *Caranx* spp. (17) DZUFRJ 27641; 27645; 27659; 27675; 27688–27690. *Caranx crysos* (1) DZUFRJ 27683. *Caranx latus* (8) DZUFRJ 27646; 27664. *Chloroscombrus chrysurus* (30) DZUFRJ 27563; 27567; 27570–27571; 27576; 27617; 27621; 27630–27631; 27640; 27651; 27684–27685. *Decapterus* spp. (11) DZUFRJ 27562; 27565; 27568; 27573; 27575; 27578. *Decapterus punctatus* (14) DZUFRJ 27627; 27635; 27638; 27652; 27667; 27671; 27680. *Naucrates ductor* (3) DZUFRJ 27636–27637. *Selar crumenophthalmus* (66) DZUFRJ 27632; 27648; 27657; 27681; 27687. *Selene setapinnis* (2) DZUFRJ 27619. *Selene vomer* (1) DZUFRJ 27564. *Oligoplites* sp. (2) DZUFRJ 27569–27670. *Seriola* sp. (9) DZUFRJ 27642; 27654; 27666; 27677. *Pseudocaranx dentex* (7) DZUFRJ 27650; 27674; 27679; 27682. *Trachurus lathami* (68) DZUFRJ 27573; 27624; 27629; 27643–27644; 27647; 27649; 27653; 27655–27656; 27658; 27661–27663; 27686. **Lutjanidae:** (12) DZUFRJ 28208–28210; 28212; 28241. *Lutjanus* spp. (5) DZUFRJ 28211; 28239; 28245. *Lutjanus synagris* (19) DZUFRJ 28237–28240; 28242–28243; 28246–28248. *Rhomboplites aurorubens* (1) DZUFRJ 28244. **Gerreidae:** (3) DZUFRJ 27345; 27351. *Eucinostomus* sp. (3) DZUFRJ 27380; 27428; 27434. *Diapterus* sp. (7) DZUFRJ 27431; 27433. *Diapterus rhombeus* (5) DZUFRJ 27346; 27382; 27437; 27439. *Eucinostomus lefroyi* (5) DZUFRJ 27344; 27347; 27383; 27430. **Haemulidae:** (44) DZUFRJ 27299; 27301; 27305–27306; 27308. *Haemulon plumierii* (4) DZUFRJ 27300; 27302; 27304. **Sparidae:** *Calamus* sp. (1) DZUFRJ 29568. *Pagrus pagrus* (37) DZUFRJ 29559–29567. **Sciaenidae:** (45) DZUFRJ 27443; 27445; 27449; 27452–27453; 27455–27457; 27464; 27474–27475; 27479; 27482. *Cynoscion* sp. (48) DZUFRJ 27441; 27446–27447; 27450; 27454; 27459; 27472–27473; 27476–27478. *Menticirrhus americanus* (3) DZUFRJ 27290; 27480. *Pareques* sp. (1) DZUFRJ 27481. *Stellifer* sp. (10) DZUFRJ 27440; 27442; 27448; 27451. **Mullidae:** (30) DZUFRJ 27515; 27535; 27859–27861; 27877; 27884; 27887. *Upeneus parvus* (11) DZUFRJ 27513–27514; 27530; 27862; 27864; 27880; 27882. **Kyphosidae:** *Kyphosus incisor* (1) DZUFRJ 29531. **Chaetodontidae:** (17) DZUFRJ 29733–29736. **Pomacanthidae:** (12) DZUFRJ 27310–27313; 28192. *Holacanthus* sp. (1) DZUFRJ 28191. *Holacanthus tricolor* (1) DZUFRJ 27309. **Cirrhitidae:** *Amblycirrhitus pinos* (4) DZUFRJ 29673. **Pomacentridae:** (12) DZUFRJ 27315; 27317; 27326; 27329. *Abudefduf saxatilis* (1) DZUFRJ 27324. *Stegastes leucostictus* (21) DZUFRJ 27314; 27316; 27319; 27322–27323; 27325; 27327–27328. *Microspathodon chrysurus* (2) DZUFRJ 27320. **Labridae:** (9) DZUFRJ 28272; 28276; 28288; 28291. *Doratonotus megalepis* (13) DZUFRJ 28277; 28279–28281; 28284; 28286–28287; 28289–28290. *Halichoeres* sp. (1) DZUFRJ 28282. *Halichoeres poeyi* (86) DZUFRJ 28273–28275; 28278; 28283. **Scaridae:** (31) DZUFRJ 28107–28114; 28186. *Cryptotomus roseus* (22) DZUFRJ 28055; 28057–28068. *Scarus* spp. (17) DZUFRJ 28048–28054. *Sparisoma* spp. (268) DZUFRJ 28142–28143; 28145–28165. **Chiasmodontidae:** *Chiasmodon niger* (1) DZUFRJ 29670. **Uranoscopidae:** (1) DZUFRJ 27556. **Tripterygiidae:** *Enneanectes altivelis* (5) DZUFRJ 29782. **Dactyloscopidae:** (6) DZUFRJ 29533–29534; 29536. **Blenniidae:** (16) DZUFRJ 29510–29513. *Hypleurochilus fissicornis* (1) DZUFRJ 29515. *Parablennius pilicornis* (2) DZUFRJ 29503; 29505. **Callionymidae:** *Callionymus bairdi* (5) DZUFRJ 29618–29620. **Eleotridae:** (1) DZUFRJ 27297. *Dormitator maculatus* (9) DZUFRJ 27291; 27293–27295. **Gobiidae:** (47) DZUFRJ 27270–27276; 27278; 27282; 27484; 27488; 27494; 27497; 27500; 27502; 27506–27508. *Coryphopterus* sp. (8) DZUFRJ 27292; 27296. *Ctenogobius* sp. (20) DZUFRJ 27489–27492; 27495–27496; 27498–27499; 27501; 27504–27505. *Ctenogobius boleosoma* (1) DZUFRJ 27277. *Gobiosoma nudum* (17) DZUFRJ 27483; 27485; 27493; 27503. *Microgobius* sp. (9) DZUFRJ 27279–27281. *Microgobius carri* (6) DZUFRJ 27486–27487. **Microdesmidae:** *Microdesmus bahianus* (9) DZUFRJ 28319; 28320–28324; 28326. *Microdesmus longipinnis* (3) DZUFRJ 28325; 28327. **Ptereleotridae:** *Ptereleotris randalli* (223) DZUFRJ 27581–27615; 29939. **Acanthuridae:** *Acanthurus* sp. (3) DZUFRJ 29672. **Sphyraenidae:** *Sphyraena barracuda* (1) DZUFRJ 28454. *Sphyraena guachancho* (15) DZUFRJ 28442; 28444–28445; 28447–28449; 28451; 28457–28458. *Sphyraena tome* (6) DZUFRJ 28443; 28455–28456. **Gempylidae:** (1) DZUFRJ 29691. *Gempylus serpens* (7) DZUFRJ 29680; 29682; 29684–29686. *Nealotus tripes* (1) DZUFRJ 29687. *Nesiarchus nasutus* (1) DZUFRJ 29688. **Trichiuridae:** *Benthodesmus* sp. (30) DZUFRJ 28250; 28252; 28256–28260. *Trichiurus lepturus* (12) DZUFRJ 28249; 28251; 28253–28255. **Scombridae:** (385) DZUFRJ 28459; 28461–28462; 28464; 28467; 28469–28470; 28472–28476; 28479; 28481–28483; 28486–28487; 29940. *Auxis* sp. (44) DZUFRJ 28380–28390. *Auxis rochei* (9) DZUFRJ 28330–28334. *Auxis thazard thazard* (3) DZUFRJ 28359–28361. *Euthynnus alletteratus* (12) DZUFRJ 28341–28345. *Scomber colias* (1,004) DZUFRJ 28416–28419; 28421–28430. *Sarda sarda* (7) DZUFRJ 28355–28358. *Scomberomorus* sp. (3) DZUFRJ 28328–28329. *Thunnus* spp. (41) DZUFRJ 27842; 28391; 28393–28395; 28397; 28400–28405. *Thunnus atlanticus* (1) DZUFRJ 28346. **Istiophoridae:** (2) DZUFRJ 29656–29657. **Nomeidae:** *Cubiceps* sp. (3) DZUFRJ 29823. *Peprilus paru* (1) DZUFRJ 28188. **Caproidae:** *Antigonia capros* (76) DZUFRJ 28352–28354. **Pleuronectiformes:** (1) DZUFRJ 29677. **Paralichthyidae:** (10) DZUFRJ 28213–28214; 28216–28218. *Citharichthys* sp. (1) DZUFRJ 28217. *Syacium papillosum* (28) DZUFRJ 28215; 29516–29530. **Bothidae:** *Bothus ocellatus* (25) DZUFRJ 29569–29580. *Monolene antillarum* (6) DZUFRJ 28205–28207. **Achiridae:** *Achirus lineatus* (2) DZUFRJ 29676. **Cynoglossidae:** *Symphurus tessellatus* (1) DZUFRJ 29727. *Symphurus trewavasae* (1) DZUFRJ 29726. **Balistidae:** *Balistes capriscus* (1) DZUFRJ 29669. **Monacanthidae:** (2) DZUFRJ 28314; 28317. *Aluterus* sp. (2) DZUFRJ 28307; 28310. *Aluterus heudelotii* (1) DZUFRJ 28311. *Aluterus schoepfii* (3) DZUFRJ 28293; 28301. *Stephanolepis hispidus* (32) DZUFRJ 28292; 28294; 28296–28299; 28302–28304; 28306; 28308; 28312–28313; 28318. **Tetraodontidae:** (2) DZUFRJ 28199–28200. *Sphoeroides* sp. (1) DZUFRJ 29775.